

## Registration of 'Antelope' Hard White Winter Wheat

'Antelope' (Reg. no. CV-968, PI 633910) is a hard white winter wheat (*Triticum aestivum* L.) cultivar developed cooperatively by USDA-ARS, the Nebraska Agricultural Experiment Station, and the Wyoming Agricultural Experiment Station. Antelope has shown exceptional productivity under irrigated trials in western Nebraska, eastern Wyoming, and eastern Colorado. It combines high grain yield under irrigation with excellent lodging resistance.

Antelope was derived from the cross 'Pronghorn'/'Arlin'. Pronghorn (PI 593047, Baenziger et al., 1997) is a strong gluten hard red winter wheat developed by the University of Nebraska. Arlin (PI 564246, Sears et al., 1997) is a hard white winter wheat developed by Kansas State University. Antelope was produced from a cross made in 1993. F<sub>1</sub> through F<sub>3</sub> generations were advanced by the bulk pedigree method. From the F<sub>3</sub> generation, 100 single-plant-progeny rows were planted. Antelope subsequently was selected from one of these rows as a single F<sub>3</sub>-derived F<sub>4</sub> line and assigned the experimental number NW97S278. Breeder seed originated from a composite of 30 F<sub>9</sub>-derived headrows which were selected for uniformity in plant type and grain color.

Antelope is awned and white-glumed. The glume beak is awned, and the shoulder is elevated to apiculate. Kernels are elliptical, with a narrow, mid-deep crease, rounded beak, and mid-sized brush. Grain samples provided to USDA-GIPSA were classified as hard white, with color characteristics acceptable for this class. Antelope contains approximately 0.1% hard red grain and also contains tall off-types at a frequency of approximately 0.5%. Coleoptile length (37 mm) is shorter than that of Pronghorn (66 mm), and similar to that of 'Nuplains' (36 mm). Average plant height (81 cm) is shorter than that of 'Arapahoe' (92 cm) but greater than that of Nuplains (78 cm). Sprouting tolerance of Antelope is less than that of Nuplains; in three Nebraska environments in which sprouting occurred, mean respective falling numbers of Antelope and Nuplains were 168 and 289 s. Hence, cultivation of Antelope is recommended only west of the 100th meridian. Average heading date (day of year 133) in Nebraska environments is identical to that of Pronghorn.

Antelope carries an unknown resistance gene for leaf rust (caused by *Puccinia recondita* Roberge ex Desmaz.), but is susceptible to current prevalent races. Resistance genes to current races of stem rust (caused by *Puccinia graminis* Pers.: Pers.) include *Sr6*, *Sr17*, and *Sr24*. Antelope was scored resistant to natural infestations of stripe rust (caused by *Puccinia striiformis* Westend) in Nebraska in 2001 and 2003. The identity of the resistance gene(s) is unknown. Antelope is susceptible to *Wheat streak mosaic virus*, *Wheat soilborne mosaic virus*, Russian wheat aphid (*Diuraphia noxia* Mordvilko), and Hessian fly (*Mayetiola destructor* Say). It has been rated in field screens as tolerant to *Barley yellow dwarf virus*.

Antelope was tested in Nebraska breeding nurseries commencing in 1997, and was entered in the USDA-ARS coordinated Western Plains Regional Performance Nursery in 2000 and in the Northern Regional Performance Nursery in 2000 and 2001. In 62 site-years of the Nebraska Fall-Sown Small Grain Variety tests in 2000–2003, average grain yield of Antelope was 3642 kg ha<sup>-1</sup>, while respective grain yields of the hard red winter wheats 'Alliance' (PI 573096) and 'Millennium' (PI 613099) were 3761 and 3845 kg ha<sup>-1</sup>, and those of the hard white wheats 'Trego' (PI 612576) and Nuplains were 3758 and 3432 kg ha<sup>-1</sup>, respectively. Mean grain volume weight of Antelope was 75.5 kg hl<sup>-1</sup>, while those of Alliance, Millennium, Nuplains, and Trego were 74.9, 76.4, 77.2, and 76.9 kg hl<sup>-1</sup>, respectively. Grain protein content of Antelope (118.5 g

kg<sup>-1</sup>) was significantly higher than that of Alliance (113.9 g kg<sup>-1</sup>), statistically equal to that of Millennium (119.4 g kg<sup>-1</sup>) and Trego (117.4 g kg<sup>-1</sup>), but significantly lower than that of Nuplains (122.1 g kg<sup>-1</sup>). Mean grain yield of Antelope from eight Nebraska irrigated trials over the 2000–2003 growing seasons was 6222 kg ha<sup>-1</sup>, while respective grain yields of Alliance, Millennium, Nuplains, and Trego were 5464, 5880, 5573, and 5680 kg ha<sup>-1</sup>.

In Wyoming, Antelope was evaluated within the Wyoming winter wheat improvement program from 2000 to 2003 (17 site-years). Under Wyoming dryland conditions, mean grain yield of Antelope was 2474 kg ha<sup>-1</sup> as compared to average grain yields of 2609 kg ha<sup>-1</sup> for Buckskin (Citr 17263) and 2400 kg ha<sup>-1</sup> for Nuplains. In Wyoming irrigated trials, respective grain yields of Antelope, Nuplains, and 'Wesley' (PI 605742) were 5932, 5427, and 5770 kg ha<sup>-1</sup>.

The milling and baking properties of Antelope were determined by the Nebraska Wheat Quality Laboratory and by the USDA-ARS Grain Marketing and Production Research Center at Manhattan, KS. Antelope is a strong gluten wheat, and carries the high molecular weight glutenin subunit combination of 2\*, 7+9, 5+10. Mean loaf volume of Antelope (825 mL) was similar to that of Nuplains (828 mL). Respective mean bake mix times, mixograph mix times, and mixograph tolerance scores of Antelope were 6.2 min, 4.8 min, and 5 (0–7 scale) while those of Nuplains were 3.8 min, 2.8 min, and 3. Chinese raw noodle making properties were evaluated by the Wheat Marketing Center, Portland, OR. Texture profile analysis of cooked noodles produced from Antelope gave hardness and chewiness scores of 1083 g and 650 g, as compared to values of 1202 g and 743 g for Nuplains. Antelope and Nuplains had similar noodle color stability, with respective L\*a\*b\* values of 8.75 and 9.03. On the basis of observations from five Nebraska growing locations in 2003, grain polyphenol oxidase (PPO) levels of Antelope (mean o.d. = 0.67) were similar to those of Nuplains (0.69) but higher than those of the low PPO hard white wheat 'Lakin' (PI 617032, 0.29).

The Breeder seed class of Antelope will be maintained by the Nebraska Foundation Seed Division, Department of Agronomy & Horticulture, University of Nebraska, Lincoln, NE 68583. Other recognized seed classes are Foundation, Registered, and Certified, as per AOSCA standards. Small quantities of seed for research purposes may be obtained from the corresponding author for at least 5 yr from the date of this publication. Seed of Antelope also has been deposited in the USDA National Small Grains Collection, Aberdeen, ID, where it will be available for research purposes, including development and commercialization of new varieties/cultivars. It is requested that the source of this material be acknowledged in future usage by wheat breeding and genetics programs

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